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A PRACTICAL TALK TO THE NURSES OF TUBERCULOUS PATIENTS *

By S. A. KNOFF, M.D.

New York

PULMONARY TUBERCULOSIS, phthisis pulmonalis, or consumption, is a chronic, infectious, and communicable disease, due to the tubercle bacilli discovered in 1882 by the great Koch. I lay stress upon the word communicable, for I do not classify pulmonary tuberculosis with the dangerous contagious diseases, and I shall give briefly my reasons for not doing so.

It is my firm conviction, based on the experiences and experiments of our greatest European and American scientists, such as Koch, Straus, Grancher, Prudden, Biggs, and others, and on a somewhat extensive experience of my own, that tuberculosis is not a dangerous contagious disease, but only a communicable one. To be in contact with a tuberculous individual who takes care of his expectorations or other secretions, which may contain the bacilli, is not dangerous. In sanatoria for consumptives, where the precautions concerning the sputum are most strictly adhered to, one is perhaps safer from contracting tuberculosis than anywhere else. The great danger from infection lies in the indiscriminate deposit of sputum containing the bacilli, which, when dry and pulverized, may be inhaled by susceptible individuals and then cause the disease to be developed. The communication of the germ of the disease is, however, less obscure to us in its process and far more easily guarded against than the contagion arising from such maladies as diphtheria, scarlet fever, or smallpox. What has just been said concerning the absolute security from infection in a well-kept sanatorium cannot very well be said of a smallpox hospital, no matter how well directed the hygienic precautions may be. Against the danger from contracting smallpox we have thus far no other means than preventive vaccination, and, in case of an outbreak of the disease, the most rigid isolation. It is entirely different with tuberculosis. The simple contact of a smallpox patient may suffice to convey the disease. This is never possible with a consumptive, even should he be careless or unclean. To the average individual a prolonged exposure is necessary to the transmission of the disease. Herein lies the difference between communicable and contagious.

* This talk was originally given at a conference of the members of the Nurses' Settlement in New York, but was written up from notes and corrected by Dr. Knopf, and is now published with his permission.—ED.

Tuberculosis cannot be contracted by simply being near the patient or by breathing the same air, but only by taking the bacilli through either inhalation, ingestion, or inoculation into our system. The expectoration and sometimes the saliva of tuberculous patients is charged with bacilli. It has been computed that one patient may expel in his sputum seven million bacilli in a day. It is these bacilli alone which have the power of conveying the disease by being introduced into the tissues of another individual.

Infection, as has been said, may take place in three ways: First, as you all know,—and this is the commonest way,—by the dissemination of particles of sputum which have dried, become pulverized, and in the form of dust are taken into the respiratory organs. In the home of the careless consumptive such bacilliferous dust floats in the air or falls to the floor. The adult may inhale it, and children, playing on the floor and frequently putting their fingers to their mouth, may be contaminated by it through inhalation and ingestion at the same time.

A less frequent source of communicating the disease is what is called “drop infection.” In sneezing, dry coughing, laughing, or excited talking the patient may often expel small particles of saliva. These particles or droplets, it should be remembered, may possibly contain bacilli. Nurses caring for tuberculous patients should therefore be careful never to directly face the patient at a short distance when any of these expulsive acts are taking place. At a distance of three feet from the patient the nurse is safe from this source, as these small particles are hardly thrown farther than this distance. These particles of bacilliferous saliva may enter our system by being inhaled or swallowed—that is to say, ingested.

As a more frequent cause of infection of tuberculosis by ingestion we must mention tuberculous milk and meat, particularly milk. You should boil or sterilize all milk from doubtful sources.

The third method of infection is by inoculation through a scratch or open wound. This may occur in cleansing vessels which contained sputum, or surgical instruments which have come in contact with tuberculous matter.

So, in caring for patients with tuberculosis, you must remember to guard against danger from these three sources. I am speaking now only in regard to your protection of yourselves, not considering others. The sputum of the patient must be carefully guarded and prevented from drying. The spittoon of the patient, of whatever form, should be partially filled with some disinfecting fluid, or at least with plain water. If he is helpless, you should receive the sputum in moist rags, and these rags must be carefully handled and burned before they have a chance

to dry. The linen and the bed-clothing of the patient should be handled in a dry state as little as possible, and be boiled before being put in the general laundry. Floor and furniture in the patient's room should be wiped with moist rags, and these should be boiled or burned afterwards; thus will you guard yourselves against infection from germ-laden dust. The patient's dishes, etc., should also be boiled after use.

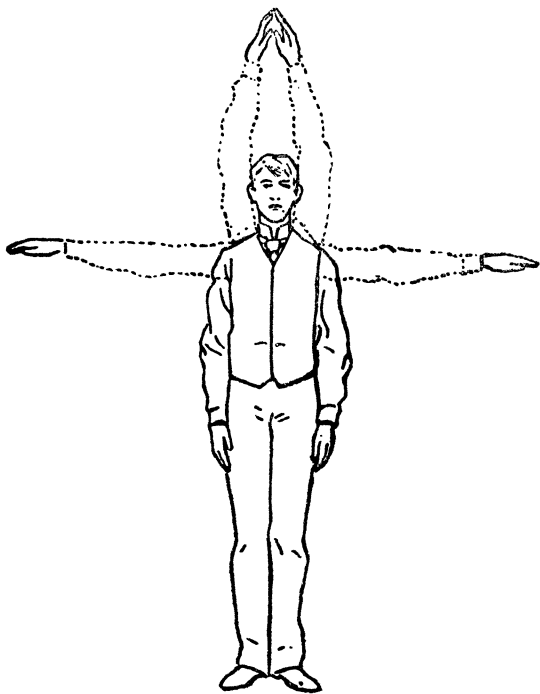
I have told you to guard yourselves against the drop infection by remaining at a little distance, especially at moments when the patient is likely to expel such drops. He should also be told always to hold a handkerchief before his mouth during the so-called dry cough or when sneezing, and the reason why explained to him. For the inoculation danger I would advise you, first, to be very careful never to allow the use of nicked or cracked spittoons. Germs will remain in these nicks and cracks and be a source of danger. But above all things I always counsel nurses in hospitals or sanatoria to wear rubber gloves when cleansing or disinfecting spittoons. Spittoons of metal or glass should always be boiled after having been emptied.

In the matter of prevention, remember that nature has done much to secure you against infection. The nasal secretions of a healthy person are bactericidal and kill the germs before they can enter the lungs. The blood, in health, contains leucocytes, white blood-corpuscles, or phagocytes, which destroy the germs. They are scavengers, which take up the dangerous parasites and destroy them (phagocytosis).

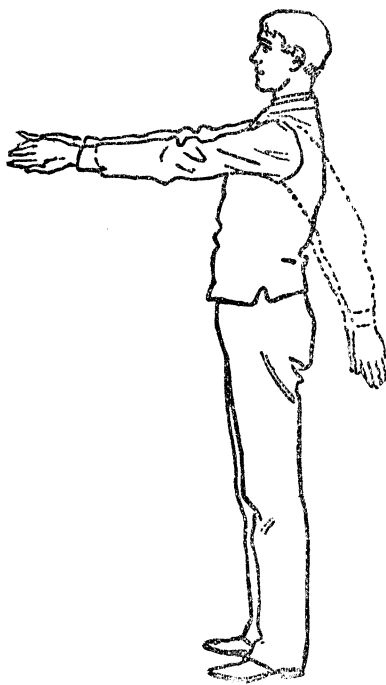
But you must always bear in mind that if you are subject to frequent colds, bronchial or nasal catarrhs, you should on no account undertake the nursing of tuberculous patients. Neither should you do so after a debilitating disease or if you are of weakly constitution. Your blood and the secretions of your nasal passages will then not have the destructive power which in robust health is sufficient to protect us all against myriads of germs. Another point: never go hungry when nursing a tuberculous patient. This advice, important in all nursing, is especially important to the nurse of the consumptive. Feed yourselves. Do not go on duty fasting, nor remain an unduly long time on duty without taking food and rest. Besides good food, a regular life,—that is, hours of work and rest reasonably divided. An excellent way in which I advise you to guard your health is by deep breathing. I will now show you the breathing exercises which I prefer to teach and practise myself.

Anyone trying to take breathing exercises must be dressed in such a manner that there is not the slightest restriction of throat, thorax, or abdomen. With tightly fitting neckwear or a tightly laced corset you cannot breathe properly. It goes without saying that these breathing

exercises must always be taken in the open air or in a well-ventilated room, preferably in front of an open window. One assumes the position of the military "attention"—heels together, body erect, chest forward, head straight, the palms of the hands touching the external portion of the thigh. With the mouth closed, take a deep inspiration through the nose,—that is to say, take in all the air possible with one inspiratory movement,—hold the breath a few seconds, and then exhale just a trifle faster. If one has learned this well, we supplement it by allowing him to raise the arms to a horizontal position. One should do this during the



First and second breathing exercises.



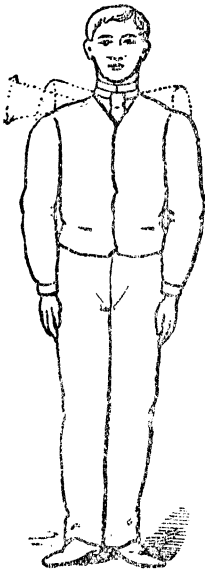
Third breathing exercise.

act of inspiration, remain in that position for a few seconds, and while exhaling bring the arms down to the original position. The act of expiration should again be a little more rapid than that of inspiration.

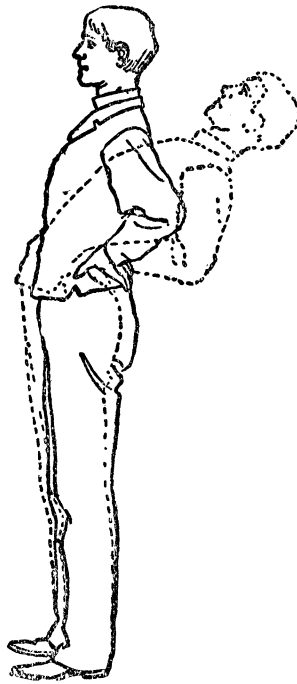
When this first exercise is thoroughly mastered after a few days, a second one can be taught, which is like the first except that the upward movement of the arms is continued until the hands meet over the head.

The third respiratory exercise, somewhat more difficult and requiring more strength and endurance, should not be undertaken until the first two have been mastered and practised for several days. The

third exercise might justly be called a dry swim; one takes the same military position of “attention,”—heels together, body erect,—and then stretches out the arms as in the act of swimming, the dorsal surfaces of the hands touching each other. He then moves the arms, just as if he were dividing the water, during the act of inspiration, the hands meeting finally behind the back. One remains in this position for a few seconds, retains the air, and during exhalation brings the arms forward. This somewhat difficult exercise can be facilitated and made more effective by rising on the toes during the act of inspiration and descending during the act of expiration.



Breathing exercise with rolling of shoulders.



Exercise for people in the habit of stooping.

Valuable as these exercises with the moving of the arms are, they cannot be practised everywhere and at all times without attracting attention. Under such conditions one must often content oneself with raising the shoulders, making a rotary movement backward during the act of inhalation. Remain in this position, holding the breath for a few seconds, and then exhale while moving the shoulders forward and downward, assuming again the normal position. This exercise can even be taken while walking, and, of course, very easily while sitting or riding in the open air.

Young girls and boys, and especially those predisposed to consumption, often acquire a habit of stooping. To overcome this the following exercise is to be recommended. The child makes his best effort to stand straight, places his hands on his hips with the thumbs in front, and then bends slowly backward as far as he can during the act of inhaling. He remains in this position for a few seconds while holding the breath, and then rises again somewhat more rapidly during the act of exhalation.

Concerning the general directions as to the frequency and order of these exercises I can only say, commence always with the easier exercises and only gradually take the more difficult ones. Repeat the exercises, either of one kind or the other, every half hour or so from six to nine times, or do three of each, and continue this practice until deep breathing has become a natural habit. One rule which is applicable to all is never to take the exercises when tired and never to continue them so long as to become tired.

In order to increase the air-supply to the lungs, and thus increase hæmatisation, I add to the ordinary exercises an additional movement by having each respiratory act—that is to say, a deep inspiration and corresponding expiration—followed by a second forced expiratory effort. This is for the purpose of expelling as much of the supplemental air as possible, which may be effectually aided by supinating the arms and pressing the thorax with them.

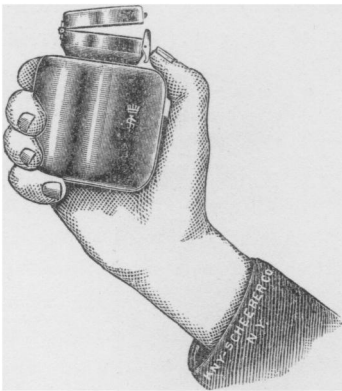
Considering that the amount of tidal air—that is to say, the volume which is inspired and expired in quiet respiration—is only five hundred cubic centimetres, the complemental air—the volume which can be inspired after an ordinary respiration—fifteen hundred cubic centimetres, and the supplemental or reserve air—the amount which can be forcibly expelled after an ordinary respiration—amounts to twelve hundred and forty to eighteen hundred cubic centimetres, one can readily see the value not only of deep breathing, but particularly of this second expiratory effort.

It is not necessary to tell you never to advise breathing exercises, but to leave that to the physician. While they may be of much value to your patient, every point must be advised by the doctor and strictly carried out. You might injure your patient by ill-advised breathing exercises. Cough is often nothing but a habit with consumptives as well as with other people. Tell the patient never to cough unless he must expectorate. It is often a purely nervous habit and may be prevented by discipline. In well-managed sanatoria the patients do not cough except when they expectorate. To avoid useless coughing, have the patient take a swallow of water or tell him to look up at the ceiling for a moment, but, above all, tell him to use his will power to suppress it.

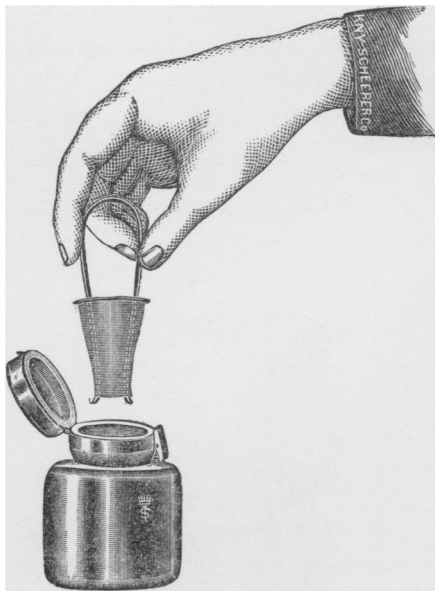
In conclusion, I would say to you all, have no undue fear of contagion while nursing tuberculous patients. “Phthisiophobia” is as bad a frame of mind as indifference to sanitary precautions. With proper precautions there should be no danger to well persons living with clean consumptives who are conscientious and careful in regard to their sputum.

There are many ways of providing expectorating facilities, and I would not be dogmatic in this respect, but I do not believe I can do better than repeat here what I have said and demonstrated at the recent meeting of the American Medical Association.

The ideal would, of course, be for everybody who is tuberculous, who has a chronic nasal or bronchial catarrh, grip, or is recovering from measles or pneumonia, or who chews tobacco, to use as a receptacle a pocket-flask which would be unbreakable and could be used without attracting attention.



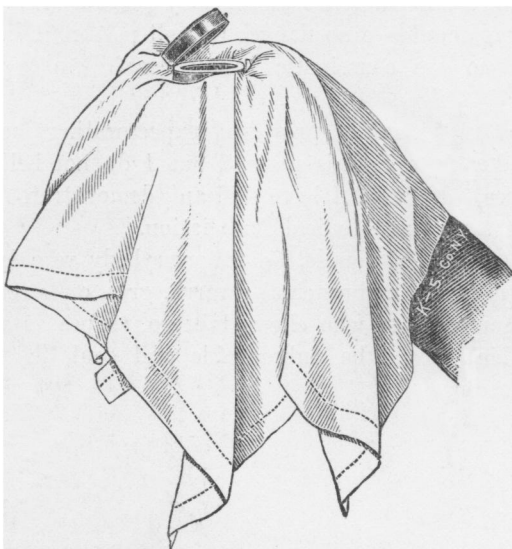
Nickel-plated, oval-shaped pocket-flask.
Manageable with one hand.



Method of emptying the flask.

I take pleasure in showing you here a little model which, perhaps, answers all these requirements. As you see, it is oval in shape and can be conveniently placed in a pocket. It is about three and three-quarters inches in height, its longest diameter is two and three-quarters inches, and its shortest diameter one and one-half inches. The opening is round and has a diameter of one and one-half inches. A movable funnel prevents the contents from soiling the cover, acting on the principle of the

irreversible inkstand. The flask is made of spring brass and is electro-nickel plated. Two seamless brass cups are welded together, forming the



The same, hidden in the folds of a handkerchief.

flask, to which the cover is firmly soldered and the funnel, spun (seamless) with a flange, fits exactly on the rim of the cup. The cover is



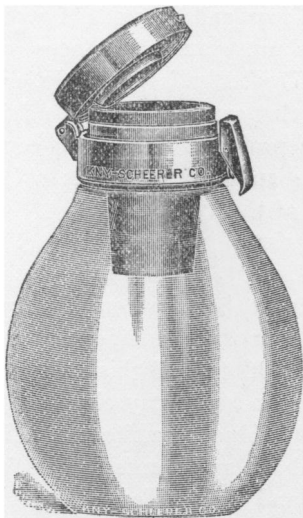
Round-shaped, nickel-plated pocket flask.
Manageable with one hand.



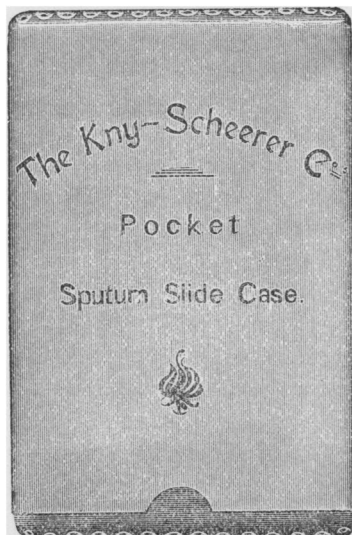
Cheap metal flask with bayonet closure.

closely fitted with an elastic rubber rim for the purpose of preventing leakage. There is a strong spring catch which serves for opening and

closing, and the flask can be manipulated with one hand by pressing with the thumb against the opening spring and closing the cover with

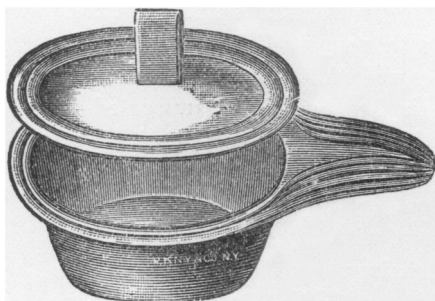


Blue glass sputum-flask. Manageable with one hand.



Pasteboard sputum-case, resembling cigar-case.

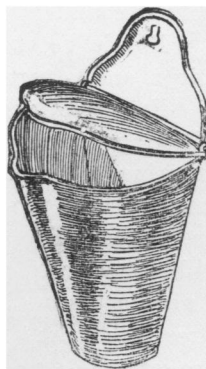
the index-finger. By the aid of a wire hook the funnel can easily be removed and the flask emptied. By placing the flask in the centre of



Pasteboard sputum-cup for bedside.



Metal spit-cup for bedside.



Proedohl's enamelled iron spittoon, to be suspended at convenient height.

a moderate-sized handkerchief, taking up the four corners, and putting an elastic band around the neck of the flask outside of the handkerchief, the cuspidor can be used without attracting any attention.

I also show you here a few less expensive spit-cups and pocket-flasks which may well answer the purpose of distribution among the consumptive poor in dispensaries and special hospitals.

For use in public institutions, in corridors and grounds, I would recommend an elevated spittoon, which has numerous advantages over the ordinary spittoon placed on the floor. The latter is unsightly, may be tipped over, and usually presents on its rim or on the outside dried sputum which did not reach the receptacle proper. Having no cover, these old-fashioned cuspidors allow animals and insects to get at the contents and thus help in the dissemination of the bacilli.

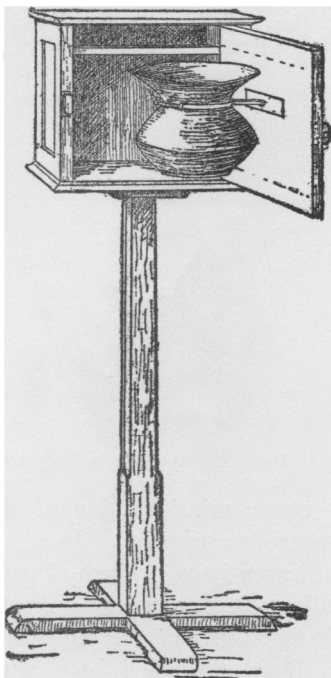
The stand of the elevated spittoon is three and one-half feet in height and consists of iron tubing with a bottom plate which can be screwed on to the floor or fastened to a sunken board when used out-of-doors. The large cast-iron base, however, is in itself sufficiently heavy to prevent the spittoon from tipping over. On top of this tube is a round box of sheet iron, with a door which can be tightly closed. Attached to this door is a ring in which rests a blue or white enamelled iron spittoon. Thus when the box is opened the spittoon is drawn forward and ready for use. The top of the stand is provided with a rim to facilitate the placing of a flowerpot or other ornament. These elevated spittoons, only visible when in use, by their convenient height and easy manipulation make the deposit of the sputum into the cuspidor more certain than is the case where spittoons are placed on the floor.

A similar elevated spittoon-stand can be made of wood, which would make it considerably cheaper (see figure).

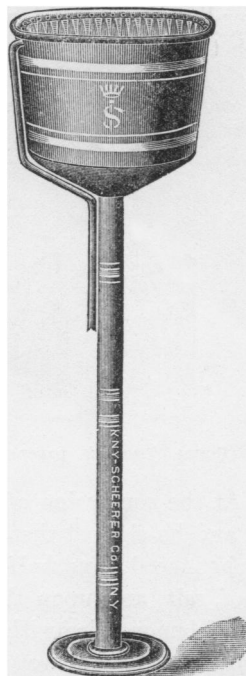
Proedohl's enamelled iron spittoon can also be suspended at any height, and is particularly suitable for use in workshops and factories.

For street use, particularly in health resorts, I have devised the following receptacle, which might deserve the name "public self-cleansing spittoon." It is thirty-nine inches in height, supported by heavy tubing; the receptacle is made of heavy copper coated with pure tin on the inside, to the upper edge of which is secured a perforated lead pipe which supplies the water for constant flushing. The receptacle is nine inches in diameter, five inches deep, with a funnel-shaped bottom three inches deep, fitting into a two-inch iron cylinder support, which also serves as a connection sewer, and this support is attached to a heavy cast-iron base. The lead-pipe water-supply passes along the outside of the apparatus and can be attached to any hydrant.

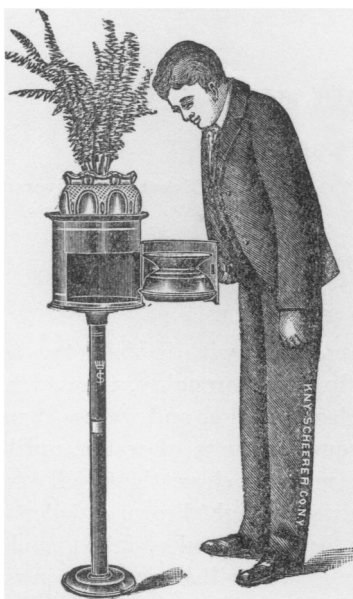
Patients who absolutely refuse to make use of the portable or pocket spittoon when outdoors should be enjoined to always carry with them squares of muslin to expectorate in. They should be advised to have a



Elevated spittoon, stand of wood—open.



Elevated self-cleaning street spittoon.

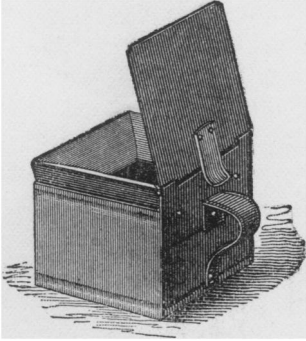


Elevated spittoon, entirely of metal—when in use.

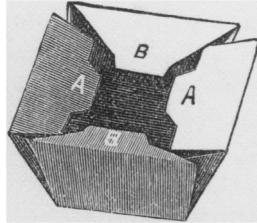


The same closed.

rubber-lined pocket in which to collect the soiled squares of muslin, which the patient should carefully burn on his return home.



Frame of metal for paper sputum-cup.



Paper sputum-cup, to be burned.

At the conclusion of the lecture the nurses asked Dr. Knopf about diet, and he showed them his way of preparing a raw egg. In a wine-glass he placed about half a teaspoonful of lemon-juice, a pinch of pepper and of salt, and upon this broke carefully a fresh raw egg. Another layer of lemon-juice with pepper and salt made the egg easy to swallow. The nurses present voted it delicious. Besides scraped beef, whole-wheat bread, and raw eggs, Dr. Knopf dwelt strongly upon the necessity of plenty of pure water.

HOME ECONOMICS

By ALICE P. NORTON

Assistant Professor of Home Economics of the School of Education, University of Chicago

(Continued from page 364)

IV. PROTEIDS AND THEIR USES.

IF one takes half a cup of flour and mixes with it about two tablespoonfuls of water, stirring it in slowly and thoroughly, then with the hands works the mass into a smooth, elastic dough, and washes it under running water, or in a bowl with frequent change of water, until the washwater loses its milky appearance and runs clear, there will remain in the hands a sticky, elastic mass, grayish or light brown in color—the gluten of the wheat. If this gluten be dried and weighed, and the weight compared with that of the flour used, it will be seen to constitute about eleven per cent. of the flour. If some of the freshly prepared